SNS COLLEGE OF TECHNOLOGY

Coimbatore-36.

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COURSE NAME : 19CST101 – PROGRAMMING FOR PROBLEM SOLVING

I YEAR/ I SEMESTER

UNIT – I INTRODUCTION TO PROBLEM SOLVING TECHNIQUES

Topic: Simple Strategies For Developing Algorithm

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Simple Strategies for Developing Algorithm

They are two commonly strategies used in developing algorithm

1. Iteration
2. Recursion

Iteration:

The iteration is when a loop repeatedly executes till the controlling condition becomes false.

The iteration is applied to the set of instructions which we want to get repeatedly executed.

Iteration includes "initialization, condition, and execution" of statement within loop and update (increments and decrements) the control variable.

A sequence of statements is executed until a specified condition is true is called iterations.

1. for loop
2. While loop

Iteration

for loop

Syntax for For:	Example: Print n natural numbers

FOR(*start-value* to *end-value*) DO
statement
... ENDFOR
	BEGIN
	GET n
	INITIALIZE i=1
	FOR (i<=n)DO
	PRINT i
	i=i+
	1
	ENDFOR
	END

```c
/* C Program to Print Natural Numbers from 1 to N using For Loop */

#include<stdio.h>

int main()
{
    int Number, i;

    printf("\n Please Enter any Integer Value  : ");
    scanf("%d", &Number);

    printf("\n List of Natural Numbers from 1 to %d are \n", Number);
    for(i = 1; i <= Number; i++)
    {
        printf(" %d \t", i);
    }

    return 0;
}
```

```
C:\Users\Suresh\Documents\C Programs\NNumber1.exe

Please Enter any Integer Value  : 5

List of Natural Numbers from 1 to 5 are
1       2       3       4       5
```

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Iteration

while loop

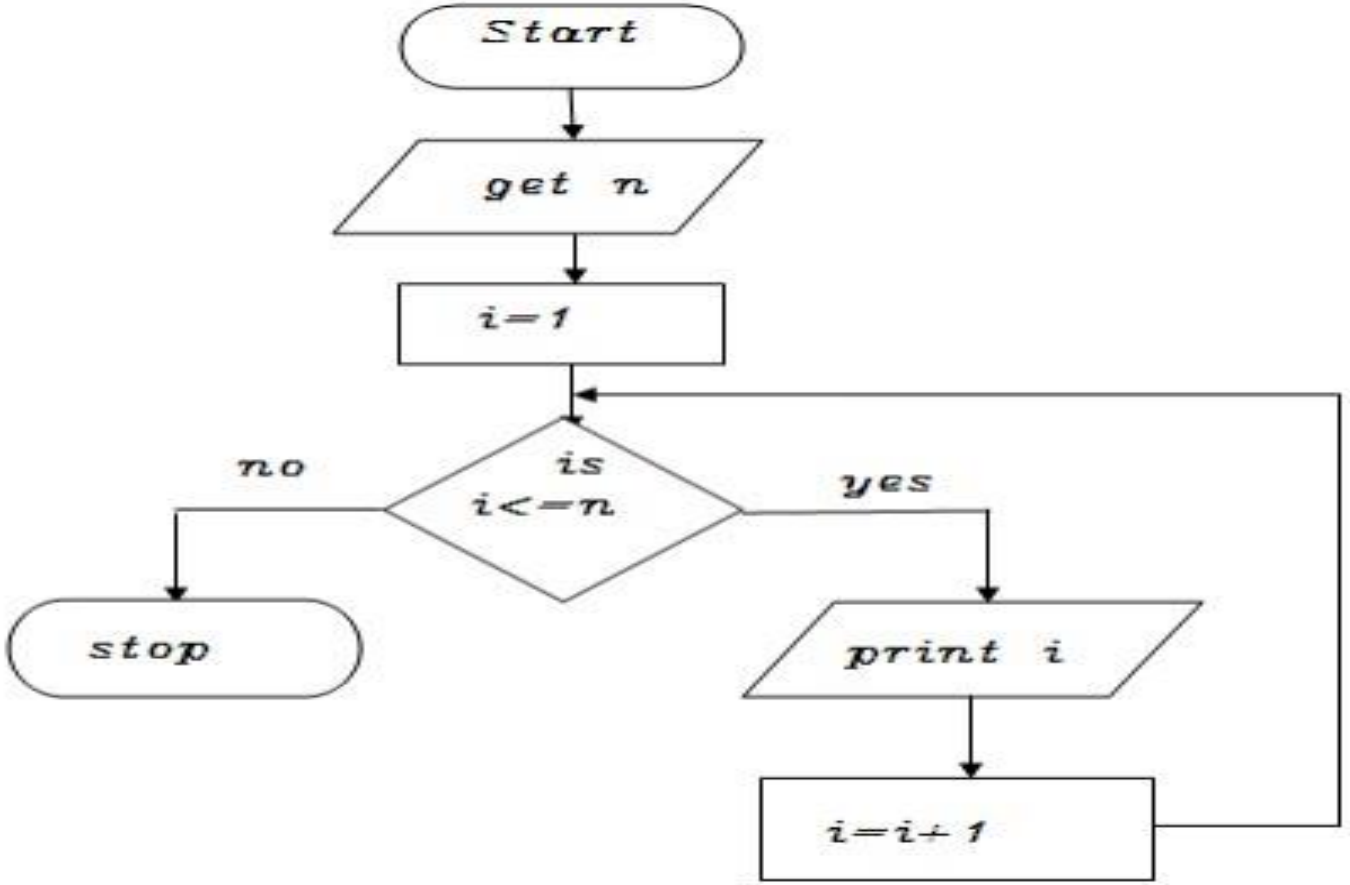
Syntax for While:	Example: Print n natural numbers
	BEGIN
WHILE (condition) DO	GET n
statement	INITIALIZE i=1
...	WHILE(i<=n) DO
ENDWHILE	PRINT i
	i=i+1
	ENDWHILE
	END

```
/* C Program to Print Natural Numbers from 1 to N using While Loop */

#include<stdio.h>

int main()
{
      int Number, i = 1;

      printf("\n Please Enter any Integer Value  : ");
      scanf("%d", &Number);

      printf("\n List of Natural Numbers from 1 to %d are \n", Number);
      while(i <= Number)
      {
      printf(" %d \t", i);
      i++;
      }

      return 0;
}
```

```
Please Enter any Integer Value  : 15

 List of Natural Numbers from 1 to 15 are
 1       2       3       4       5       6       7       8       9       10      11
```

Iteration

Flow chart for (for loop & while loop)



Recursion

Recursions:

A function that calls itself is known as recursion.

Recursion is a process by which a function calls itself repeatedly until some specified condition has been satisfied.

Algorithm for factorial of n numbers using recursion

Main function:

Step1: Start
Step2: Get n
Step3: call factorial(n)
Step4: print fact
Step5: Stop

Sub function factorial(n):

Step1: if(n==1) then fact=1 return fact
Step2: else fact=n*factorial(n-1) and return fact

Recursion

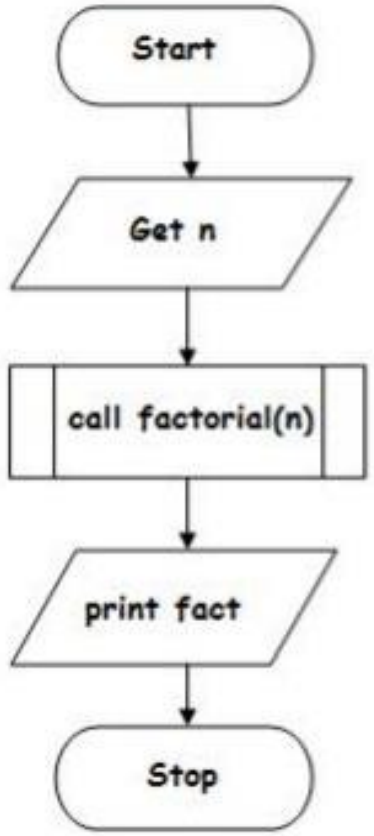
Pseudo code for factorial using recursion:

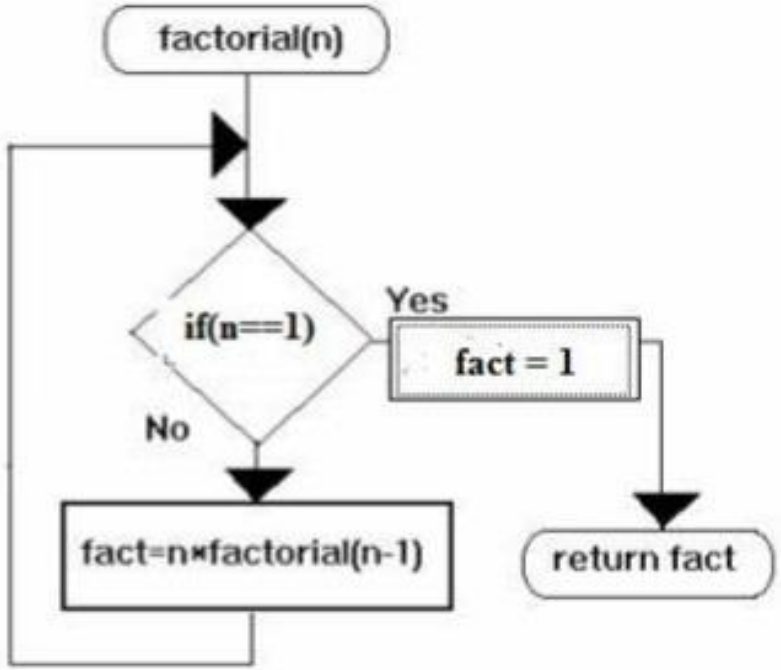
Main function:

```
BEGIN
GET n
CALL factorial(n)
PRINT fact
END
```

Sub function factorial(n):

```
IF(n==1) THEN
    fact=1
    RETURN fact
ELSE
     RETURN fact = n * factorial (n - 1)
```





Recursion

Project | Classes | Debug

test.c

```
1   #include<stdio.h>
2   #include<conio.h>
3   void main()
4   {
5   int n=0,f=0;
6   printf("enter the number");
7   scanf("%d",&n);
8   f=fact(n);
9   printf("factorial of %d is %d",n,f);
10  }
11  int fact(int n)
12  {
13   if(n==1)
14   return 1;
15   else
16    return(n*fact(n-1));
17   }
```

C:\Users\Ad\Documents\test.exe

```
enter the number 6
factorial of 6 is 720
--------------------------------
Process exited after 2.411 seconds with return value 21
Press any key to continue . . .
```


Thank
you